

Appl. No. 10/675,050
Amdt. dated 3/17/06
Reply to Office action of October 19, 2005

REMARKS/ARGUMENTS

Reconsideration of the application is requested.

Applicant appreciatively acknowledges the Examiner's confirmation of receipt of Applicant's claim for priority under 35 U.S.C. § 119(a)-(d) and certified copy of German Patent Application 102 45 484.1, filed September 30, 2002.

Claims 1-8 remain in the application and are subject to examination. No claims have been amended, added or canceled.

In "Claim Rejections - 35 USC § 103", item 1 on pages 2-4 of the above-identified Office Action, claims 1-4 have been rejected as being obvious over Applicant's Acknowledged Prior Art (hereinafter AAPA) in view of U.S. Patent No. 6,781,357 to Balakrishnan et al. (hereinafter Balakrishnan) under 35 U.S.C. § 103(a).

In "Claim Rejections - 35 USC § 103" item 2 pages 4-5 of the Office Action, claim 5 has been rejected as being obvious over AAPA in view of Balakrishnan and further in view of U.S. Patent No. 6,052,268 to Thomas under 35 U.S.C. § 103(a).

In "Claim Rejections - 35 USC § 103" item 3 pages 5-6 of the Office Action, claim 6 has been rejected as being obvious

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over AAPA in view of U.S. Patent No. 5,757,203 to Brown under
35 U.S.C. § 103(a).

As will be explained below, it is believed that the claims
were patentable over the cited art in their original form
and, therefore, the claims have not been amended to overcome
the references.

Before discussing the prior art in detail, it is believed
that a brief review of the invention as claimed, would be
helpful. Claim 1 calls for, *inter alia*, a method for driving
a semiconductor switch having load current limiting and
thermal protection, a maximum load current being limited and
the semiconductor switch switching off upon a predetermined
upper temperature being exceeded and switching on again when
a chip temperature falls below a predetermined lower
temperature, which comprises the steps of:

operating the semiconductor switch in one of a normal
mode and a fault mode;

operating the semiconductor switch in the fault mode
upon exceeding the predetermined upper temperature; and

limiting a load current to a first maximum value in the
normal mode and to a second maximum value, being lower
than the first maximum value, in the fault mode.

Independent claim 6 calls for, *inter alia*, a circuit
configuration, comprising:

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a semiconductor switch having a drive terminal and a load path;

a protective circuit connected to said drive terminal of said semiconductor switch;

a temperature sensor disposed in a region of said semiconductor switch and coupled to said protective circuit, said temperature sensor providing a temperature measuring signal fed to said protective circuit; and

a current measuring configuration coupled to said protective circuit and generating a current measuring signal being dependent on a current across said load path of said semiconductor switch;

said protective circuit storing first and second overcurrent signals, said protective circuit assuming one of a first operating mode and a second operating mode, and, depending on a mode, said protective circuit controlling said semiconductor switch according to a comparison of the current measuring signal to the first overcurrent signal or according to a comparison of the current measuring signal to the second overcurrent signal.

Claim 1 of the instant application thus relates to a method for driving a semiconductor switch having load current limiting functionality and thermal protection. Due to the current limiting functionality, a maximum load current of the semiconductor switch is limited to a given maximum current value, and due to the thermal protection the semiconductor switch is switched off, if a temperature exceeds a predetermined upper temperature, and is switched on again, if a chip temperature falls below a predetermined lower temperature. The semiconductor switch may be operated in one of a normal mode and a fault mode.

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According to claim 1, the semiconductor switch operates in fault mode after the temperature has exceeded the predetermined upper temperature. The load current of the semiconductor switch is:

- a. limited to a first maximum value in the normal mode, and
- b. to a second maximum value, being lower than the first maximum value, in the fault mode.

In addition, claim 1 recites "operating the semiconductor switch in the fault mode upon exceeding the predetermined upper temperature."

The Examiner's argumentation that such a method which takes AAPA and Balakrishnan into account was obvious to one skilled in the art, is not convincing from Applicant's point of view.

The Balakrishnan reference discloses a method and apparatus for maintaining a constant load current with line voltage in a switch mode power supply. According to Fig. 1 of the reference, a power MOSFET is connected to an oscillator generating three signals 10, 15, 20 with different waveforms. A comparator modulates the duty cycle. A search of the Balakrishnan patent reveals that the word "temperature" does not appear anywhere in the patent.

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According to the AAPA disclosed in Figs. 1 and 2 of the instant application, a load current of a semiconductor switch is limited to a given maximum value (I_{ds1}). Furthermore, the semiconductor switch is switched off if a chip temperature exceeds an upper temperature value (T_{so}), and is switched on again if the chip temperature falls below a given lower chip temperature.

In contrast to the method recited in claim 1 of the instant application, the prior art method does not include operating the semiconductor switch in one of a normal mode and a fault mode. The Examiner's opinion that in the prior art method the semiconductor switch is in a normal mode when switched on and is in a fault mode when switched off, is not correct.

Assuming that the semiconductor switch is switched on in the normal mode and is switched off in the fault mode, there would be no need to provide a second maximum value for the fault mode. Thus, even a combination of the AAPA and Balakrishnan does not result in the method of claim 1.

Furthermore, the Examiner has stated that it would have been obvious to combine the teachings of temperature sensing in AAPA with Balakrishnan because "a rise in current normally

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accompanies rsie in temperature." However, since Balakrishnan has nothing to do with temperature, the required hint or suggestion in the prior art for making a proper combination is missing.

The Examiner's argumentation with regard to claim 1 is therefore respectfully believed to be unreasonable from Applicant's point of view and therefore claim 1 and its dependent claims 2-5 are believed to patentable over AAPA in view of Balakrishnan.

As stated above, claim 6 has been rejected over a combination of AAPA and Brown. Brown relates to multiple on-chip IDDQ monitors. The Brown device appears to having nothing to do with the subject matter of the instant application. Brown also does not contain the word "temperature." Furthermore, the argumentation given above with respect to AAPA in view of Balakrishnan holds true for AAPA in view of Brown as well. More specifically, AAPA and Brown do not show a semiconductor switch which is in a normal mode when switched on and is in a fault mode when switched off as well as a temperature sensor disposed in a region of a semiconductor switch and coupled to the protective circuit, the temperature sensor providing a temperature measuring signal fed to the protective circuit, as recited in claim 6.

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Claim 6 is thus also believed to be patentable over the prior art of record.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claims 1 or 6. Claims 1 and 6 are, therefore, believed to be patentable over the art. The dependent claims are believed to be patentable as well because they all are ultimately dependent on claims 1 or 6.

Finally, Applicant appreciatively acknowledges the Examiner's statement that claims 7 and 8 "would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims." In light of the above, applicants respectfully believe that rewriting of claims 7 and 8 is unnecessary at this time.

In view of the foregoing, reconsideration and allowance of claims 1-8 are solicited.

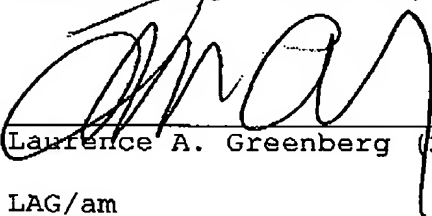
In the event the Examiner should still find any of the claims to be unpatentable, counsel would appreciate receiving a telephone call so that, if possible, patentable language can be worked out.

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Petition for extension is herewith made. The extension fee for response within a period of three months pursuant to Section 1.136(a) in the amount of \$450.00 in accordance with Section 1.17 is enclosed herewith.

Please charge any other fees that might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner Greenberg Stemer LLP, No. 12-1099.

Respectfully submitted,



Laurence A. Greenberg (29,308)

LAG/am

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Lerner Greenberg Stemer LLP
P.O. Box 2480
Hollywood, Florida 33022-2480
Tel.: (954) 925-1100
Fax: (954) 925-1101